


# Workshop on Draft 2015 SCAQMD Annual Network Plan

June 04, 2015



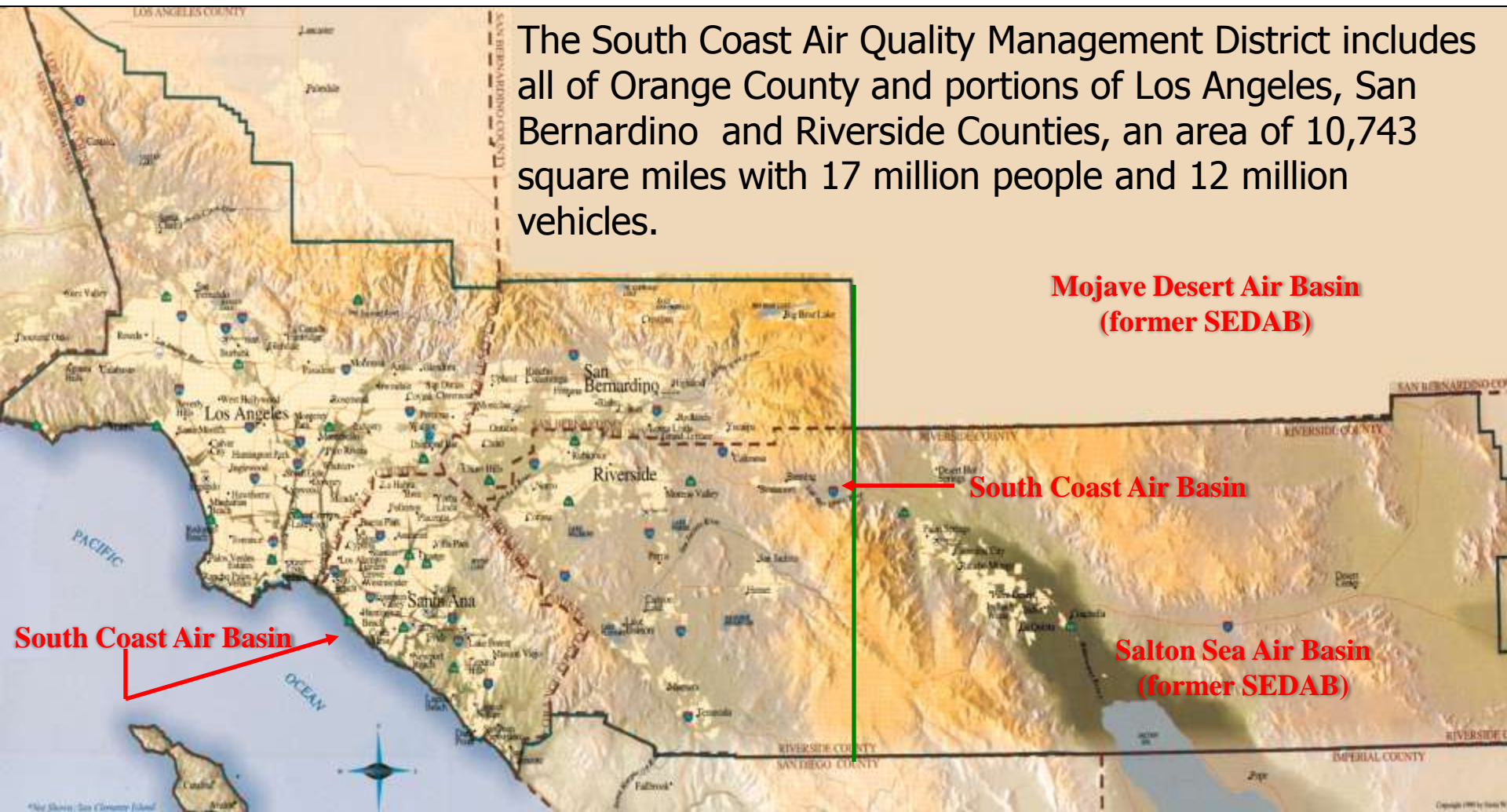
# Overview

- ▶ Background
  - ▶ Monitoring Network
  - ▶ Annual Network Plan and Requirements
  - ▶ Recent and Proposed Modifications
  - ▶ Near Road Monitoring
  - ▶ Special Programs
  - ▶ PM<sub>2.5</sub> Continuous Monitor Comparability Assessment
  - ▶ Further Discussion
- 



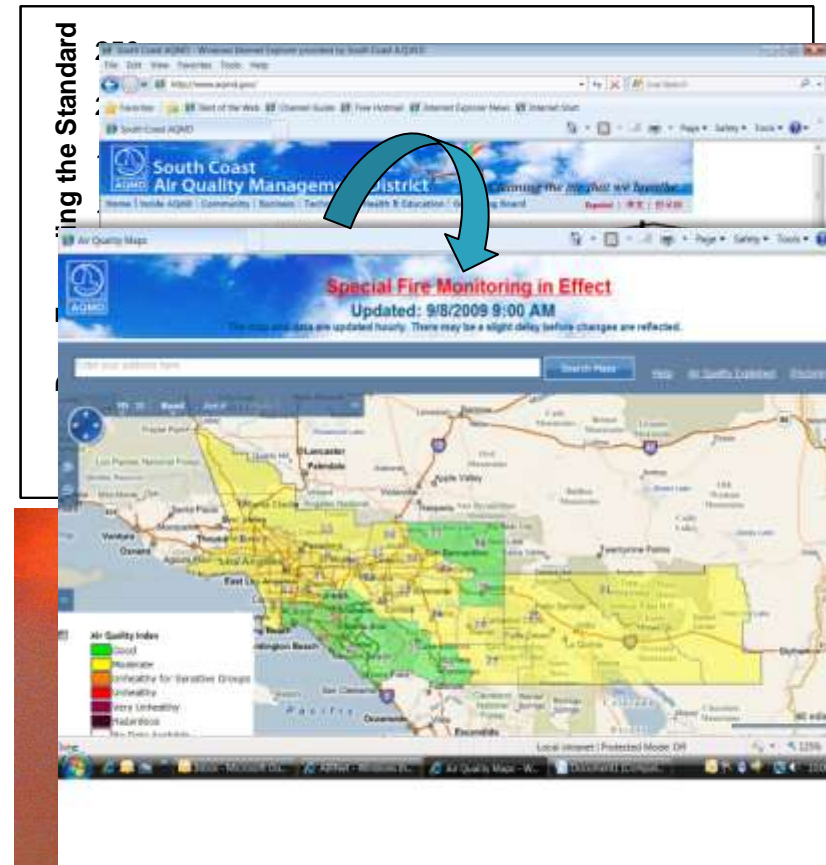
# South Coast Air Quality Management District

The South Coast Air Quality Management District includes all of Orange County and portions of Los Angeles, San Bernardino and Riverside Counties, an area of 10,743 square miles with 17 million people and 12 million vehicles.



# Objectives of Air Monitoring

- ▶ Support Compliance with Air Quality Standards and Emission Strategy Development
- ▶ Support Air Pollution Research
- ▶ Provide Air Pollution Data to the General Public



# SCAQMD Monitoring Network

- ▶ 36 permanent, air pollutant monitoring stations
- ▶ 4 additional single pollutant monitors for source Lead (pb)
- ▶ 4 NO<sub>2</sub> near road monitors
- ▶ Meets U.S. EPA Program Requirements where applicable
  - Criteria Pollutants, NCore
  - PAMS
  - NATTS
  - PM<sub>2.5</sub> Speciation



# Annual Network Plan

- ▶ Document that shows evaluation of existing network and discussion of upcoming changes for review by public and U.S. EPA
  - State Implementation Plans
  - Attainment Designations
- ▶ Available on SCAQMD website
  - <http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan>
- ▶ Requirements
  - Submitted by July 1<sup>st</sup> of each year to U.S. EPA Regional Administrator
  - Public Inspection/ Comment
  - Description of Monitors
  - Network Modifications

# NAAQS Attainment Status of South Coast Air Basin

Criteria Pollutant	Averaging Time	Designation <sup>a)</sup>	Attainment Date <sup>b)</sup>
1979 <b>1-Hour Ozone<sup>c)</sup></b>	1-Hour (0.12 ppm)	Nonattainment (Extreme)	(not attained) <sup>c)</sup>
1997 <b>8-Hour Ozone<sup>d)</sup></b>	8-Hour (0.08 ppm)	Nonattainment (Extreme)	
2008 <b>8-Hour Ozone</b>	8-Hour (0.075 ppm)	Nonattainment (Extreme)	
<b>CO</b>	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance)	(attained)
<b>NO<sub>2</sub><sup>e)</sup></b>	1-Hour (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	Annual (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (attained)
<b>SO<sub>2</sub><sup>f)</sup></b>	1-Hour (75 ppb)	Designations Pending (expect Unc./Attainment)	N/A (attained)
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/Attainment	(attained)
<b>PM<sub>10</sub></b>	24-hour (150 µg/m <sup>3</sup> )	Attainment (Maintenance) <sup>g)</sup>	7/26/2013 (attained)
<b>PM<sub>2.5</sub><sup>h)</sup></b>	24-Hour (35 µg/m <sup>3</sup> )	Nonattainment	12/14/2014
	Annual (12.0 µg/m <sup>3</sup> )	Designations Pending (expect Nonattainment)	N/A
	Annual (15.0 µg/m <sup>3</sup> )	Nonattainment	4/5/2015 (attained 2013)
<b>Lead</b>	3-Months Rolling (0.15 µg/m <sup>3</sup> )	Nonattainment (Partial) <sup>i)</sup>	12/31/2015

# NAAQS Attainment Status of Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation <sup>a)</sup>	Attainment Date <sup>b)</sup>
1979 1-Hour Ozone <sup>c)</sup>	1-Hour (0.12 ppm)	Nonattainment (Severe-17)	(not timely attained <sup>c)</sup> )
1997 8-Hour Ozone <sup>d)</sup>	8-Hour (0.08 ppm)	Nonattainment (Severe-15)	
2008 8-Hour Ozone	8-Hour (0.075 ppm)	Nonattainment (Severe-15)	
CO	1-Hour (35 ppm) 8-Hour (9 ppm)	Unclassifiable/Attainment	N/A
NO <sub>2</sub> <sup>e)</sup>	1-Hour (100 ppb)	Unclassifiable/Attainment	N/A
	Annual (0.053 ppm)	Unclassifiable/Attainment	N/A
SO <sub>2</sub> <sup>f)</sup>	1-Hour (75 ppb)	Designations Pending	N/A
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/Attainment	N/A
PM10	24-hour (150 µg/m <sup>3</sup> )	Nonattainment (Serious) <sup>g)</sup>	(redesignation request submitted) <sup>g)</sup>
PM2.5 <sup>h)</sup>	24-Hour (35 µg/m <sup>3</sup> ) Annual (15.0 µg/m <sup>3</sup> ) Annual (12.0 µg/m <sup>3</sup> )	Unclassifiable/Attainment Unclassifiable/Attainment Not Determined	N/A
Lead	3-Months Rolling (0.15 µg/m <sup>3</sup> )	Unclassifiable/Attainment	N/A

# Air Monitoring Network Requirements

- ▶ Each pollutant requires a minimum number of monitors based upon certain criteria
- ▶ Population metrics are based upon latest available information
- ▶ Design value years are 2012–2014

Pollutant	Minimum Monitor Criteria
Ozone	MSA Population Design Value Concentration
Near Road NO2	MSA Population Annual Average Daily Traffic
NO2	CBSA Population
SO2	CBSA Population SO2 Emissions (tons/year)
Pb	Pb Emissions (NEI)
PM10	MSA Population Design Value Concentration
PM2.5	MSA Population Design Value Concentration

Counties	Population (2013)
Los Angeles Orange	13,131,431
San Bernardino Riverside	4,380,878

# Ozone

Counties	8-hr Design Value (ppb) DV, Years <sup>1</sup>	Design Value Site (name AQS ID)	Monitors Required	Monitors Active
Los Angeles Orange	97, 2012-2014	Santa Clarita 060376012	4	16
San Bernardino Riverside	102, 2012-2014	Redlands 060714003	3	13

## Ozone (O<sub>3</sub>) Monitoring Stations



Last Updated: March 17, 2015

# PM2.5

## Federal Reference Method (FRM)

Counties	Annual Design Value [ug/m3], DV & Years <sup>1</sup>	Annual Design Value Site (Name, AQS ID)	Daily Design Value [ug/m3], DV & years	Daily Design Value site (name AQS ID)	# Required SLAMS Monitors	# Active SLAMS Monitors
Los Angeles Orange	12.4, 2012-2014	Los Angeles 060371103	32, 2012-2014	Los Angeles 060371103	3	10
San Bernardino Riverside	14.7, 2012-2014	Mira Loma 060658005	38, 2012-2014	Mira Loma 060658005	3	9

## Continuous: Federal Equivalent Method (FEM) and non FEM; Speciation

Counties	Annual Design Value [ug/m3], DV & Years <sup>1</sup>	Annual Design Value Site (Name, AQS ID)	Daily Design Value [ug/m3], DV & years	Daily Design Value site (name AQS ID)	# Required Continuous Monitors	# Active Continuous Monitors	Speciation Monitors Required <sup>1</sup>	Speciation Monitors Active
Los Angeles Orange	19.73, 2011-2013	Los Angeles 060371103	45.9, 2011-2013	Los Angeles 060371103	2	4-FEM 3-Non FEM	1	2
San Bernardino Riverside	20.47, 2011-2013	Mira Loma 060658005	43.0, 2011-2013	Mira Loma 060658005	2	2-FEM 6-Non FEM	1	2

\* Currently all active continuous monitors do not meet acceptance criteria under 78 FR 3086 (Appendix C) and is requested to not be compared to the NAAQS

# PM2.5 Network Map

## PM 2.5 Monitoring Stations



# PM10

Counties	Max Concentration [ug/m3]	Max Concentration site (name AQS ID)	# Required Monitors	# Active Monitors	# Additional Monitors Needed
Los Angeles Orange	98	Azusa 060370002	2-4 Low Conc	8	0
San Bernardino Riverside	136 <sup>1</sup>	San Bernardino 060719004	4-8 Med Conc	11	0

<sup>1</sup>Excluding high concentration at Indio (298 ug/m<sup>3</sup>, on 8/18/2014.)

## PM 10 Monitoring Stations



Last Updated: March 17, 2015

# Nitrogen Dioxide (NO<sub>2</sub>)

Counties	Max AADT Counts (2010) <sup>1</sup>	# Required Near Road Monitors <sup>2</sup>	#Active Near Road Monitors <sup>3</sup>	#Required Area Wide Monitors	#Active Area Wide Monitors
Los Angeles Orange	377,000 2013	2	2	1	15
San Bernardino Riverside	267,000 2013	2	2	1	8

<sup>1</sup>Max AADT Counts – 2013 is the latest data available from CA DOT.

## Nitrogen Dioxide (NO<sub>2</sub>) Monitoring Stations



Last Updated: March 17, 2015

# Sulfur Dioxide (SO<sub>2</sub>)

Counties	Total SO <sub>2</sub> <sup>1</sup> [tons/year]	Population Weighted Emissions Index <sup>2</sup> [million persons-tons per year]	#Required Area Wide Monitors	#Active Area Wide Monitors
Los Angeles Orange	6102.45 2013	80,134	1	4
San Bernardino Riverside	2307.02 2013	10,107	1	2

<sup>1</sup>Using latest NEI data 2013, available on EPA website: <http://www.epa.gov/ttn/chief/net/2013inventory.html>

<sup>2</sup>Calculated by multiplying CBSA population and total SO<sub>2</sub> and dividing product by one million.

## Sulfur Dioxide (SO<sub>2</sub>) Monitoring Stations



Last Updated: March 17, 2015

# Carbon Monoxide (CO)

CBSA	#Required Near Road Monitors <sup>1</sup>	#Active Near Road Monitors <sup>2</sup>	#Required Area Wide Monitors	#Active Area Wide Monitors
Los Angeles Orange	1	1	0	16
San Bernardino Riverside	1	1	0	7

<sup>1</sup>Required beginning January 1, 2015

<sup>2</sup>Required sites to be active by January 1, 2015; to be implemented concurrently with near road NO<sub>2</sub> sites.

## Carbon Monoxide (CO) Monitoring Stations



Last Updated: March 17, 2015

# Lead (Pb)

## Pb at NCore

NCore Site (name, AQS ID)	# Required Monitors	# Active Monitors	# Additional Monitors Needed
Los Angeles (Main Street) 060371103	1	1	0
Rubidoux 060658001	1	1	0

## Source Oriented Pb Monitoring (Including Airports)

Source Name	Address	Pb Emissions <sup>1</sup> (tons per year)	Emission Inventory Source <sup>2</sup> and Data Year	Max 3-Month Design Value <sup>1</sup> [ug/m3]	Design Value Date(third month, year)	# Required Monitors	# Active Monitors	# Additional Monitors Needed
Long Beach Airport Daugherty Field	4100 E Donald Douglas Dr, Long Beach, CA 90808	0.8	NEI 2011	Unavailable	Unavailable	Pending 5 year assessment	0	0
Van Nuys Airport <sup>1</sup>	16461 Sherman Way, Van Nuys, CA 91406	0.68	NEI 2011	0.06	7; 2012	0	0	0
TAMCO	12459-B Arrow Route, Rancho Cucamonga, CA 91739	0.42	NEI 2011	Unavailable	Unavailable	0	1	0
Exide Technologies	2700 S Indiana St, Vernon, CA 90058	0.1	NEI 2011	0.46	7; 2011	1	2	0
Trojan Battery	9440 Ann St., Santa Fe Springs, CA 90670	0.00556	NEI 2011	0.11	4; 2011	0	1	0
Quemetco Inc.	720 S 7th Ave, City Of Industry, CA 91746	0.0048	NEI 2011	0.11	7; 2010	0	1	0

<sup>1</sup>Consider data from past three years.

<sup>2</sup>Data found at <http://www.epa.gov/ttn/chief/net/2011inventory.html> (5/1/2014)

# Lead (Pb) Network

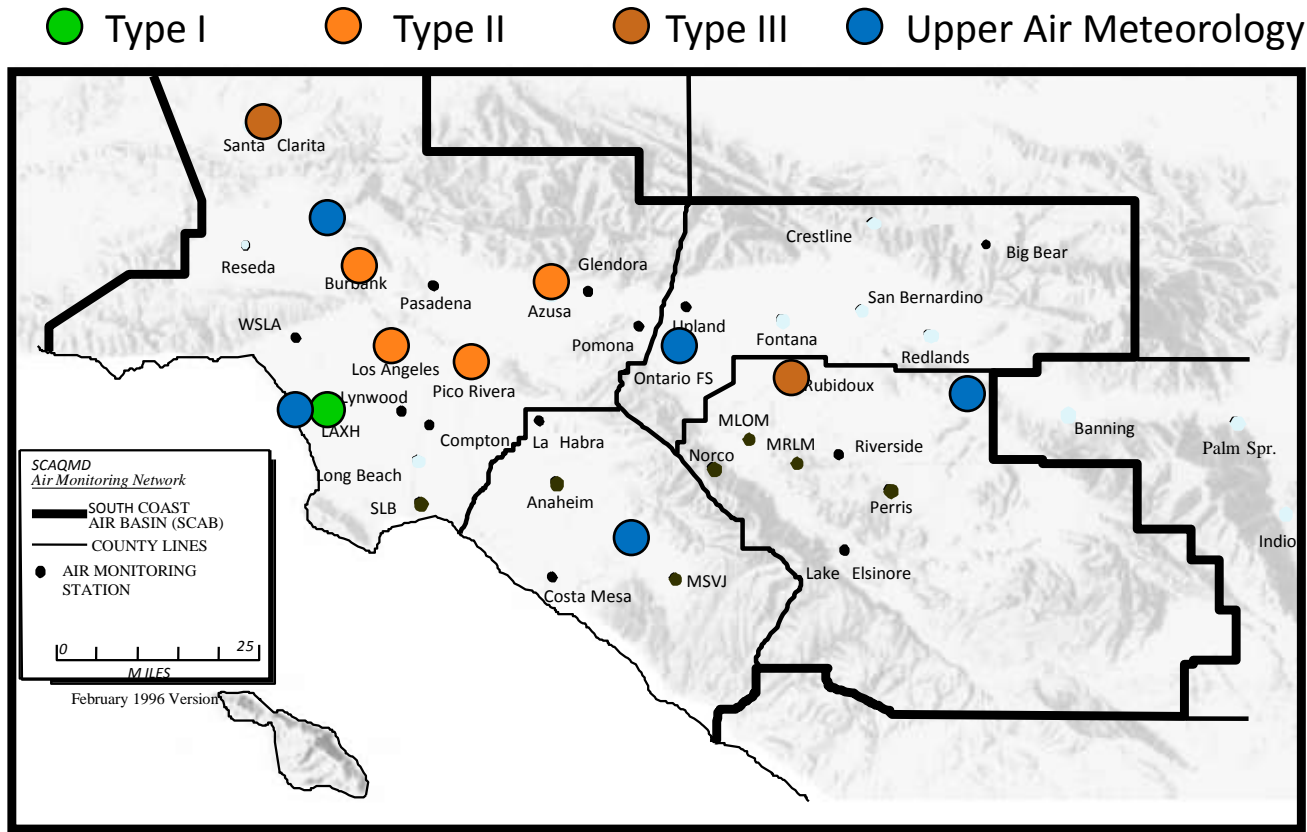
CBSA	Max 3-Month Design Value <sup>1</sup> [ug/m <sup>3</sup> ]	# Required Area Wide Monitors	# Active Area Wide Monitors
Los Angeles Orange	0.01, 2012-2014	0	5
San Bernardino Riverside	0.01, 2012-2014	0	3

Source & Ambient Particulate Lead Monitoring Stations



Last Updated: March 17, 2015

# SCAQMD PAMS Measurements (Traditional Network)

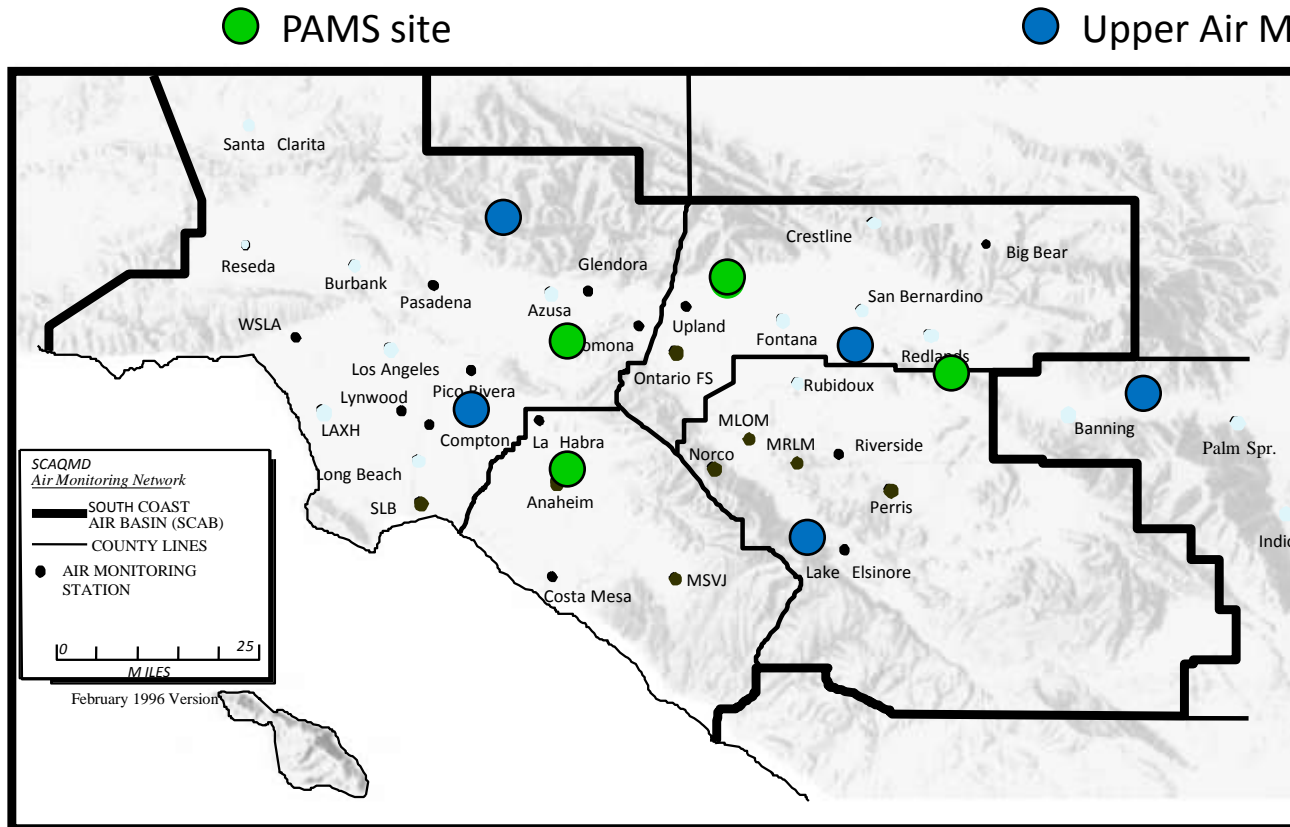


- Ozone
- NO/ NO2/ NOy
- CO
- Speciated VOC
- Carbonyl
- Meteorology

# Federal Regulatory Revisions Being Considered


- ▶ Reduce number of required sites to 1 per area but expand PAMS applicability to all O<sub>3</sub> non-attainment areas
  - Require PAMS at NCore sites in O<sub>3</sub> non-attainment areas but allow for Regional approval of alternative site (e.g., existing type 2 PAMS sites)
  - Require sites to collect **hourly VOC data**
  - Require sites to collect carbonyls (formaldehyde, etc.)
  - Require sites to measure **“true NO<sub>2</sub>”** in addition to current NO<sub>y</sub>
  - Change requirement for upper air meteorology to requirement for measuring **mixing height**
- ▶ Require all O<sub>3</sub> NA areas to also develop and implement an “enhanced ozone monitoring plan”
  - Could include additional O<sub>3</sub> sites, PAMS sites, radar profilers, mobile sites, etc.

# Proposed SCAQMD PAMS 2.0 Sites (Non Intensive Years)



- ▶ Ozone
- ▶ **Direct NO<sub>2</sub>**, NO<sub>x</sub>, NO<sub>y</sub>
- ▶ CO
- ▶ **Hourly VOC**
- ▶ Carbonyls 1 in 6 day (24 hour average)
- ▶ Meteorology
- ▶ Upper air meteorology

# PAMS 2.0 Intensive Year

- ▶ Conducted on AQMP Modeling year (2017/2018)
  - ▶ Higher Spatial Resolution
  - ▶ Measurements
    - Ozone, Vertical Profile
    - Direct NO<sub>2</sub>, NO<sub>x</sub>, Noy, CO
    - Hourly VOC
    - Carbonyls 1 in 6 day (24 Hour Average)
    - Carbonyls (3 Hour Average)
    - Meteorology
    - Upper air meteorology
  - ▶ Mobile Platforms – Special Studies
  - ▶ Modeling
- 

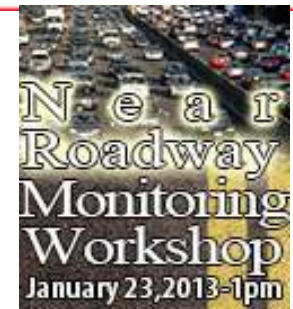
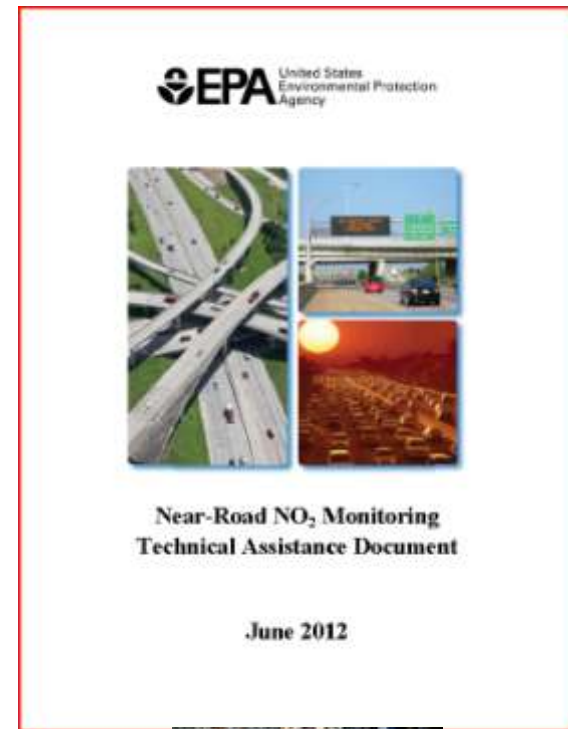
# Recent or Proposed Modifications to Network

- ▶ Site Closures
  - Long Beach (North) – Relocation
  - Burbank – Relocation
  - Riverside Magnolia
  - Ontario Fire Station
  
- ▶ Station Improvements
  - Crestline
  - West LA
  - South Long Beach
  - San Bernardino
  - Indio –Done



# Near Road NO<sub>2</sub>: Candidate Road Segment Ranking Process

- ▶ Incorporates U.S. EPA TAD Considerations
  - FE AADT
  - Roadway Design
  - Spacing
  - Meteorology
  - Roadside Structures
  - Terrain
- ▶ Site Survey of Top 12 Ranked FE AADT Roadways in South Coast Basin
  - 9 Los Angeles–Long Beach–Santa Ana CBSA
  - 3 Riverside–San Bernardino–Ontario CBSA
  - Existing 710 Freeway Site
- ▶ SCAQMD Public Workshop (January 2013)
  - Overview of Site Selection Process
  - Discussion with Public



# Near Roadway Monitor Site Considerations for 2015

- ▶ 40 CFR Part 58 Appendix D: Second site required if:
  - CBSA has a population of 2.5 million or more
  - CBSA has a population of 500,000 or more and one or more segments of 250,000 AADT or greater
- ▶ Near Road NO<sub>2</sub> Monitoring TAD 2<sup>nd</sup> Site Guidance:
  - Sites should be differentiated from first site
    - Fleet mix, congestion patterns, geographic area, population exposure
  - Consider initial data from first site

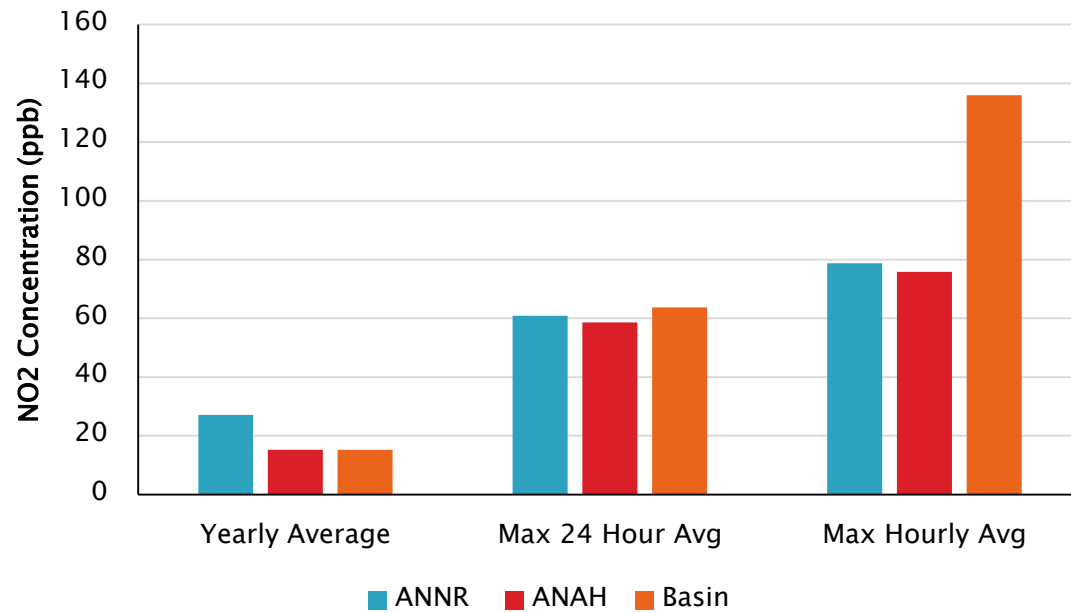


## Map of Highest Ranking Candidate Roadway Segments/ Proposed Monitor Locations

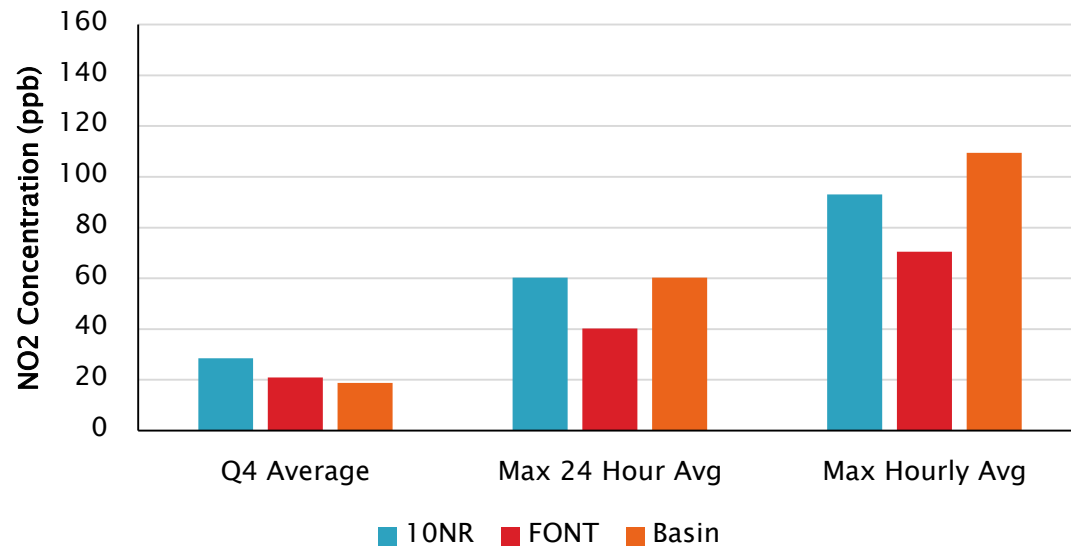


# Near Road

## Anaheim I-5 2014



## Etiwanda I-10 Q4 2014



# Special Programs

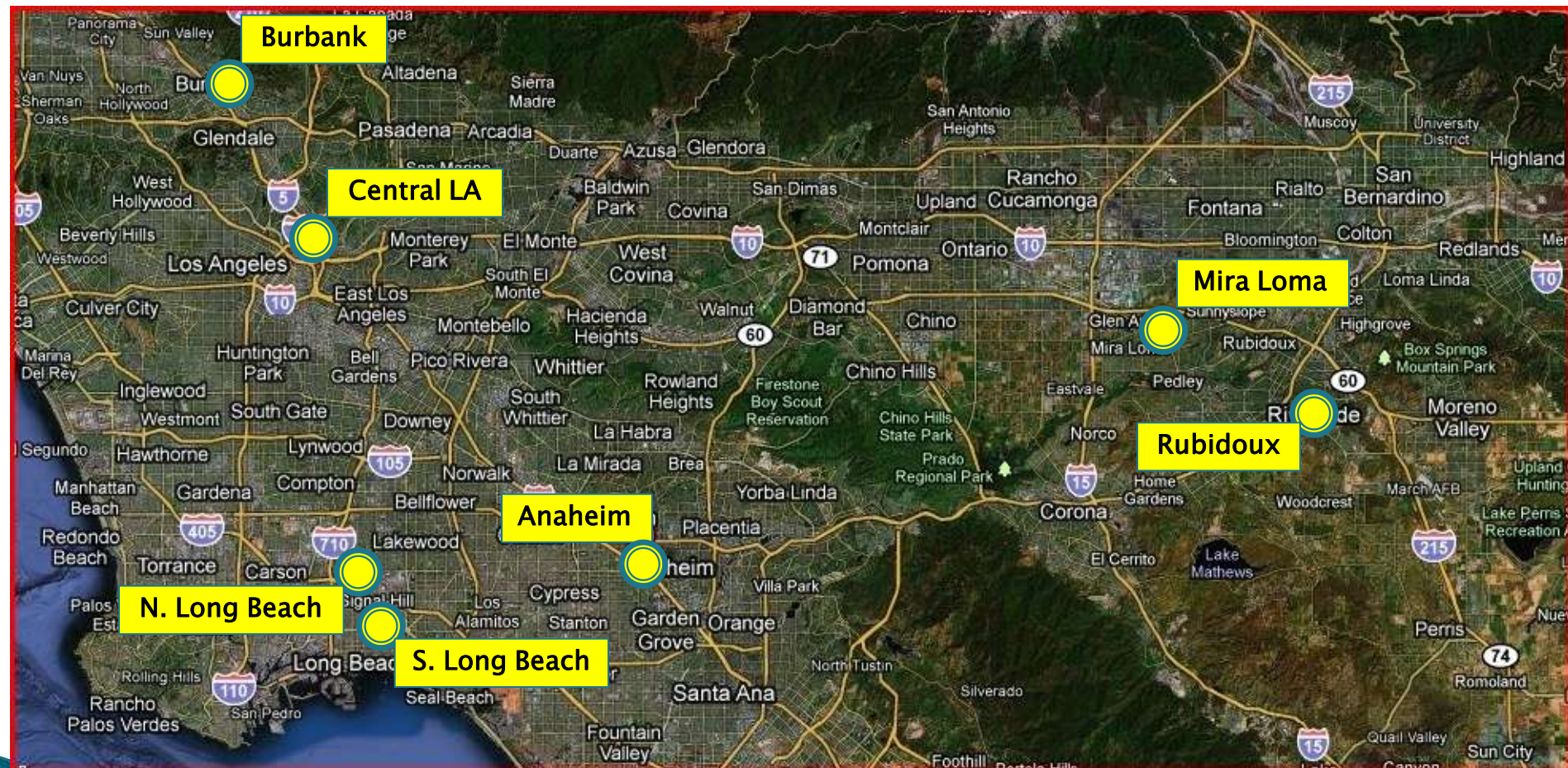
- ▶ MATES IV
- ▶ Fugitive Dust Study
- ▶ Hexavalent Chrome
- ▶ Gerdau-Tamco
- ▶ Salton Sea
- ▶ AllenCo
- ▶ Duarte
- ▶ CPV Sentinel
- ▶ Carlton Forge



# PM2.5 Continuous Monitor Comparability Assessment

- ▶ Continuous PM2.5 measurement network (FEM)
  - Supplements traditional filter-based methods (FRM)
  - Provides real-time public AQI information
- ▶ Any request to U.S EPA regarding the use of continuous data for NAAQS comparison is due in our Annual Network Plan submittal by June 30, 2015.
- ▶ 40 CFR §58.11(e) identifies the technical performance criteria for requesting exclusion of FEM data from comparison to the NAAQS
  - The statistical information required in §58.11(e) were generated using EPA's "PM2.5 continuous monitor comparability tool" available on-line

# Sites with both FRM and FEM



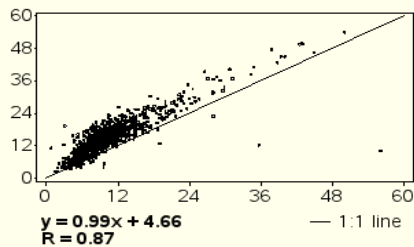
- Continuous monitors used as part of SCAQMD's PM2.5 monitoring program
- FRM and FEM monitors operated concurrently at seven network locations

# PM2.5 FEM/ FRM Method Comparison

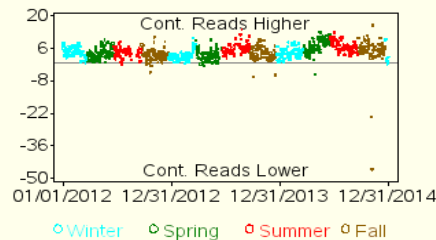
## PM<sub>2.5</sub> Continuous Monitor Comparability Assessment Site 06-059-0007: Anaheim, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1  
Cont: Met-One BAM-1020 W/PM2.5 SCC-Beta Attenuation (731), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

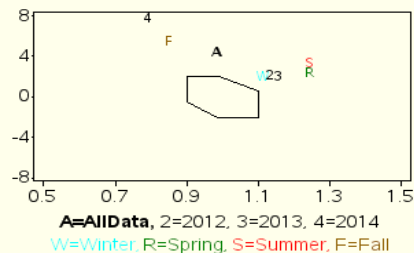
Cont. (y) vs. FRM (x) PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )



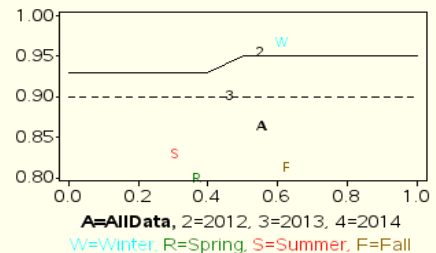
Cont. minus FRM PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )



Additive (y) vs. Multiply (x) Bias



R (y) vs. FRM CCV (x)



Mean PM<sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	979	10.6	15.1	1.43
Winter	246	12.3	15.9	1.30
Spring	251	9.1	13.9	1.52
Summer	229	9.0	14.8	1.64
Fall	253	11.7	15.7	1.34
2012	326	10.9	14.8	1.35
2013	314	10.2	14.1	1.38
2014	339	10.5	16.3	1.55

Appendix A Statistics

Dataset	N	Bias (all observations)	N	Bias (only >= 3 $\mu\text{g}/\text{m}^3$ )
AllData	979	51.6	970	50.1
Winter	246	35.7	240	34.3
Spring	251	55.1	250	55.2
Summer	229	67.7	229	67.7
Fall	253	49.1	251	44.1
2012	326	38.7	324	38.4
2013	314	42.0	309	41.2
2014	339	72.9	337	69.4

2014 PM<sub>2.5</sub> FEM/FRM Comparison did not pass criteria for equivalency

Comparisons of measurements between 2010 to 2014 show that the FEM method can read significantly higher PM<sub>2.5</sub> mass concentrations than the FRM method


FEM can be 0 to 60% higher depending on site and year

These differences have been observed nationwide to varying degrees

Differences are due to “semi-volatile” PM material

- The measurement of these PM components (ammonium nitrate, organic compounds, water) are highly dependent on temperature, humidity, sample handling, and thus method.

# Request For Exclusion of PM2.5 FEM Data From Comparison to the NAAQS

- SCAQMD PM2.5 FEM monitors do not meet the performance criteria specified by U.S. EPA
  - As part of the 2015 Annual Monitoring Network Plan, SCAQMD staff is making the request to U.S. EPA that all data from all PM2.5 FEM monitors be excluded for comparison to the NAAQS
  - SCAQMD staff is working to optimize the monitoring instrumentation to meet all of our monitoring objectives
  - FEM data are of sufficient quality to be used for real-time public AQI reporting
- 

# Further Discussion

## ▶ 5-Year Network Assessment

- Comprehensive look-back and review of network
- Respond to anticipated reduction in federal funding
- Right-Size Network based on:
  - Technical Needs
  - Financial Resources
- Present ideas to consider
- Solicit Feedback

# 5-Year Network Assessment

## ► Items Under Consideration

- CO Network – Downsizing potential
  - Currently xxx monitors
  - CO remains well below NAAQS levels
- NO<sub>2</sub> Network – Downsizing potential
  - Currently 25 NO<sub>2</sub> monitors
  - No exceedance in 2009–2014 of the 98<sup>th</sup> percentile of 100 ppb (1-hour NO<sub>2</sub> NAAQS)
  - Only six monitors critical for air quality forecast

# 5-Year Network Assessment

## ► Items Under Construction (continued)

- Explore opportunities to consolidate stations
  - Address redundancy of monitored pollutants/siting issues (e.g. Upland/Pomona stations)
- Consider eliminating some stations if no longer relevant to planning process
- Consider adding stations, if necessary (e.g. PM10 station in Saul Martinez in Coachella Valley)

# Concluding Remarks

- ▶ Public Comments by 6/22/15
  - Contact: Jason Low (909) 396-2269 ([jlow@aqmd.gov](mailto:jlow@aqmd.gov))
- ▶ Final Draft Submission to EPA by July 1, 2015
- ▶ U.S. EPA Review by November 1, 2015

# Discussion

## Workshop on Draft 2015 Annual Network Plan

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**June 4, 2015**

2:00 p.m. to 4:00 p.m.

**SCAQMD Headquarters Conference Room CC2**

21865 Copley Drive

Diamond Bar, CA 91765

